DOCUMENT RESUME

ED 376 402 CG 025 808

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TITLE Differences in Learning Strategies for High, Middle, and Low Ability Students Measured by the Study Process Questionnaire.
PUB DATE 4 Mar 94
NOTE 16p.; Paper presented at the Annual Meeting of the National Association of School Psychologists (26th, Seattle, WA, March 1-5, 1994).
PUB TYPE Speeches/Conference Papers (150) -- Reports - Research/Technical (143)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Classroom Environment; *Cognitive Style; *College Students; Higher Education; Intentional Learning; Learning Modalities; *Learning Strategies; Learning Theories; Memorization; *Rote Learning; Student Motivation; Study; *Study Habits
IDENTIFIERS Scholastic Aptitude Test; Study Process Questionnaire (Biggs)

ABSTRACT

Although research over the past 20 years has examined the dynamics of student learning, most initial studies focused on how scholastic aptitude tests and teacher rating scales predicted academic success. This study attempts to determine the relationship between scholastic aptitude and three approaches to learning: (1) presage; (2) process; and (3) product. The researcher administered the Study Process Questionnaire (SPQ) to 532 undergraduates to investigate the relationship between scholastic aptitude and the Surface, Deep, and Achieving approaches to learning. Scholastic aptitude was measured by the Scholastic Aptitude Test (SAT). Results indicate that students scoring highest on the SAT used the Surface Approach more often than middle or low-ability students. That is, those with higher abilities chose to adopt rote memorization as a learning strategy to achieve high grades in school. Students scoring lowest on the SAT reported using the Deep Approach more often than students in the middle or high ability groups. Students with higher abilities may be using a Surface Approach because the American system fosters this type of learning style and/or such an approach marks the most efficient method for academic success in certain courses. Contains 8 references. (RJM)

Differences in Learning Strategies for High, Middle, and Low Ability Students Measured by the Study Process Questionnaire

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Paper presented at the National Association of School Psychologists

26th Annual Convention, Seattle, Washington

March 4, 1994

INTRODUCTION

A variety of research has been conducted over the past twenty years examining the dynamics of student learning. Initially, studies focused on the selection process and prediction of academic success for higher education through the use of scholastic aptitude tests and teacher rating scales (Marton, Hounsell, & Entwistle, 1984). In addition, other variables were studied extensively such as intelligence, socioeconomic status, and cognitive styles to determine if these factors contributed to the prediction of college performance (Biggs, 1978). However, Entwistle and Ramsden (1984) reported that the primary focus of research began to shift in the 80's from these variables to identifying the specific processes and the specific methods which underlie individual learning styles among secondary and university level students.

Biggs (1987) began investigating study behavior to determine if there were particular styles associated with a student's approach to learning. He began this process by developing a general three-stage model of student learning in 1978. The three stages included were presage, process, and product. These stages describe how a student's prior knowledge influences their specific motives and strategies to produce a desired performance. For example, a student's I.Q., personality, and family background are personal factors influencing

performance (presage). These factors are combined with situational factors such as the subject being studied, the teaching methods, and the amount of time being spent on a task. Secondly, the process stage involves motives and strategies which a student uses to accomplish the desired goal. This goal is the product, or third stage, and is measured by grade point average or personal satisfaction.

The focus of Biggs (1987) work developed around stage two, the learning process complex, of his student learning model. This stage refers to how motives and strategies are combined and utilized when a student engages in study behavior. Three approaches to learning were identified: Surface, Deep and Achieving. Among these approaches, three distinct motives and three distinct strategies were also identified to facilitate learning and performance. For example, an individual utilizing the Surface Approach (SA) may possess Surface Motives (SM) which involve studying to meet only minimal requirements. Therefore, the Surface Strategies (SS) a student engages in are strategies to retrieve the essential information through rote learning. The Deep Approach (DA) has an intrinsic value for the student and involves Deep Motives (DM) to obtain competence in a particular academic subject. The Deep Strategies (DS) used include relating previous knowledge with relevant, novel information and trying to read a broad range of similar subjects. Finally, the Achieving Approach (AA) is used by students whose Achieving Motives (AM) are to maintain high grades, regardless

of the material being studied. They use Achieving Strategies (AS) which involve time management and the development of organizational skills.

It is important to realize that Biggs (1987) believed a student could have a Deep Motive but still utilize a Surface Strategy. For example, situational factors such as the structure of the course or the method of evaluation can influence a student's strategy when learning (Marton & Saljo, 1976; Biggs & Kirby, 1983; Biggs & Kirby, 1984). The individual may have an intrinsic motivation to become competent in a particular subject, but the design of the class may only require surface knowledge. Therefore, rote learning and memorization will be the essential strategies to promote learning for this particular course. Ultimately, the student can still maintain a deep motive for learning and studying.

Purpose of the Study

The SPQ was used to examine the relationship between scholastic aptitude and the Surface, Deep, and Achieving approaches to learning. Scholastic aptitude was measured by the Scholastic Aptitude Test (SAT) and divided into three categories: High SAT (960 to 1160), Middle SAT (780-950), and Low SAT (550-770).

Limitations of the Study

The results of this study should be generalized with caution because student participation was limited to individuals enrolled in psychology courses at a large southeastern university.

Generalizations should only be made to those populations which closely resemble the participants of this study.

Method

Subjects

Five hundred thirty two students enrolled in psychology classes at a large southeastern university volunteered to participate in this study. There were 169 male subjects and 363 female subjects. Ethnic groups consisted of 466 Whites, 50 Blacks, 2 Hispanics, 5 Asians, 5 Native Americans, and 3 Other (missing data on 1 subject). The range of ages for the participants was 18-54 years with a mean of 23 years and a standard deviation of 6.67 years. A breakdown of participants in each age group included: 220 within the < 20 year age range, 227 in the 21-25 year age range, 40 in the 26-35 year age range, and 35 in the 36-54 year age range (10 subjects failed to report age). Finally, 188 students were classified as Freshman, 66 as Sophomores, 45 as Juniors, 188 as Seniors, 12 as graduate students, and 7 as students with special status at the graduate level (data missing on 16 subjects). Appendix A provides descriptive information about this sample.

Instrumentation

The Study Process Questionnaire (SPQ) is a 42 item self-report measure of a student's approach to learning, and the responses are scored by using a 5-point Likert scale. A total of six subscale scores are obtained (three motive and three strategy) to yield a Surface, Deep, or Achieving approach to

learning.

In 1979, Biggs recruited university students to begin his sampling procedures of the SPQ. Individuals enrolled in universities and students enrolled in the college of advanced education (CAE) volunteered to participate in the sample. Biggs reported that his final sample contained 853 university students and 1512 CAE students, with a 40 percent return rate of the questionnaires. In addition, he reported a breakdown of the sample by sex, status, year, and faculty which included: 1016 males, 1597 females; 2325 full-time, 287 part-time; 1053 first year, 548 second year, 569 third year, 456 fourth year; 504 in Arts, 1183 in Education, and 729 in Science. It is important to notice that the breakdown of numbers is not consistant with Biggs final sample size reported.

Internal consistency was the measure of reliability used with the standardization group, specifically the alpha coefficient (the extent to which the items in the scale measure the same characteristic). The nine subscales of the SPQ obtained alpha coefficients ranging from .51 to .81., and the three Approach subscales obtained higher coefficients than the Motive or Strategy subscales.

Procedure

Psychology students enrolled in psychology classes voluntarily participated in the study. However, some professors provided extra credit to those students choosing to participate. Permission forms and the SPQ questionnaire were given to each

student to complete during a class period by School Psychology graduate students. In addition, these questionnaire's provided a brief explanation of the instrument to each participant. After completing the questionnaire, the participants were asked to provide information such as gender, race, student classification, major area of study, future educational plans, socioeconomic status, home community size, and primary language spoken. Finally, they were required to sign permission forms providing permission to obtain individual SAT scores from the ECU Registrar's Office.

The 532 participants were subdivided into high, middle,and low ability groups based on their SAT scores. The high group (960 to 1160) were comprised of 80 students; the middle group (780-950) of 206 students; and the low group (550-770) of 102 students. SAT scores were not available for 144 subjects.

Results

The means and standard deviations were computed for the the three levels of SAT in relation to the Surface, Deep,

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Insert Table 1 about here

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and Achieving Approaches to learning. In addition, a Pearson correlation analysis was utilized to determine the strength of the relationship among the dependent variables.

Insert Tables 2 & 3 about here

A factorial analysis of variance for the three approaches to learning was also computed. Main effects of SAT for the Surface Approach and the Achievement Approach were found.

Discussion

The purpose of this study was to determine the relationship between scholastic aptitude and the three approaches to learning. The results indicated that students scoring highest on the SAT reported using the Surface Approach more often than middle or low ability students. The students in the high SAT group also reported utilizing the Achievement Approach more often than the middle and low ability students. Therefore, the participants in this study who have higher abilities chose to adopt rote memorization as a learning strategy to achieve high grades in school.

Biggs (1987) found that poor academic achievement was closely related to a Surface Approach. Therefore, high ability students would be expected to utilize Deep or Achieving Motives and Strategies when approaching a learning task, while students with lower abilities, as measured on the SAT, would be expected to utilize Surface Motives and Strategies more often.

The results of this study show that students scoring lowest on the SAT reported using the Deep Approach more often than students in the middle or high ability groups. Alternatively, students scoring high on the SAT adopted Surface and Achievement Motives and Strategies more often than the other two ability groups.

groups.

It can be speculated that the differences in the preferred learning styles with the students in this sample occurred because of the variation in course structure and requirements at the undergraduate level. Biggs (1987) stated that students could have Deep Motives while still utilizing Surface Strategies when learning. Thus, the design of an undergraduate cours may require that a student memorize only the facts which would constitute utilizing a Surface Approach. The higher ability level students may determine that the best way to complete an academic task would be to utilize Surface Strategies to achieve. However, they can still maintain an intrinsic motivation or interest in the subject (Marton & Saljo, 1976; Biggs & Kirby, 1983; Biggs & Kirby, 1984).

The results from this study reflect the tendency of students with high achievement motivation to utilize rote memorization as a more efficient strategy to achieve in school. Therefore, students with the higher abilities may be using a Surface Approach more often because: 1) the American System fosters this type of learning style, and/or 2) it is the most efficient means for academic success in certain introductory courses at the undergraduate level (Corno, 1983; Marton & Saljo, 1976; Biggs, 1987). Further research to differentiate the role of class requirements, the structure in teaching approaches and learning styles is needed.

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Table 1

Means and Standard Deviations for the three levels of SAT on SA, DA, and AA.

	SA		DA		AA	
Variable	M	SD	M	SD	M	SD
TSAT						
High	35.28	6.08	39.71	7.29	40.55	8.54
Middle	32.89	6.65	40.70	7.37	37.89	7.06
Low	31.99	5.31	39.74	7.47	36.40	6.70

Note. TSAT - Total Scholastic Aptitude Test Score; SA - Surface Approach; DA - Deep Approach; AA - Achievement Approach.

Correlations among the Dependent Variables

Variable	SA	DA
SAT		
High DA	-.26	
High AA	.27	.61
Middle DA	-.02	
Middle AA	.39	.41
Low DA	.30	
Low AA	.45	.67

Note. For significance: $r \geq .32$; $df=529$; $p<.001$; SA - Surface Approach; DA - Deep Approach; AA - Achievement Approach

Table 3

Main Effects Based on the Factorial Analysis of Variance for the Three Approaches to Learning

D.V.	Source	DF	MS	F*
SA				
	SAT	2	250.98	6.72
AA				
	SAT	2	342.44	6.51

*Note. For significance: $F(2,529) = 4.66$, $p<.001$;
SA - Surface Approach; DA - Deep Approach; AA - Achievement Approach.

Appendix A

Descriptive Data on the SPQ Sample at ECU

	N	Percent
Student Enrollment		
Full-Time	440	82.7
Part-Time	26	4.8
(missing data)	66	12.5
Major Area of Study		
Education	248	46.6
Business/Management	98	18.4
Sciences	71	13.3
Arts	63	11.8
Nursing/Health Science	40	7.5
(missing data)	12	2.2
Degree Sought		
Associates Degree	9	1.7
Bachelors Degree	174	32.7
Masters Degree	217	40.8
Certificate of Advanced Studies	9	1.7
Doctoral Degree	51	9.6
(missing data)	72	13.5
Annual Income of Chief Wage Earners		
40 thousand dollars or more	205	38.5
30-40 thousand dollars	127	23.9
20-30 thousand dollars	95	17.9
10-20 thousand dollars	49	9.2

Less than 10 thousand dollars	20	3.8
(missing data)	36	6.8
Occupation of Chief Wage Earner		
Business or Professional	363	68.2
Manual Labor	52	9.8
Clerical or Sales	37	7.0
Farm	18	3.2
Non-labor Force	16	3.0
(missing data)	46	8 6
Home Community Population Size		
1 million or more	11	2.1
500,000-999,999	42	7.9
50,000-499,999	119	22.3
2,500-49,999	192	36.1
Less than 2,500	98	18.4
(missing data)	70	13.2
Primary Language Spoken in Home		
English spoken as primary language	490	92.1
English spoken most of the time	33	6.2
English spoken sometimes	9	1.7